Patent Claims

1. A method for thermally working a workpiece consisting of a ferromagnetic material by means of a thermal working tool (1) which is moveable along a workpiece surface (7), wherein an alternating magnetic field is produced for controlling a working distance (A) between said working tool (1) and said workpiece surface (7), said magnetic field acting both in the area of said workpiece surface (7) and in a sensor body with ferromagnetic properties above said workpiece surface (7), said magnetic field or changes thereof being sensed by means of a measuring device (9; 10), and measurement signals of said measuring device (9; 10) being evaluated for controlling said working distance (A), characterized in that said torch head (2) and at least one of the cutting or welding tools (3, 4; 5) are used as sensor body (2; 3; 4; 5).

2. The method according to claim 1, characterized in that said magnetic field is produced by means of an exciting coil (6) through which said sensor body (2; 3; 4; 5) extends such that magnetic field lines (13) are running through said body above and below a cross-sectional plane through which a central coil plane (14) of said exciting coil (6) extends, and that said magnetic field lines (13) above said coil plane (14) are sensed by means of an upper measuring element (9), a first measurement signal being produced that has a first amplitude and a first phase, and that said magnetic field lines (13) below said coil plane (14) are sensed by means of a lower measuring element (10), a second measurement signal being produced that has a second amplitude and a second phase, the relative position between first phase and second phase being determined, and a phase shift being used for controlling the working distance (A).

3. The method according to claim 2, characterized in that said upper measuring element is designed as an upper measuring coil (9) and said lower measuring element as a lower measuring coil (20), and that said upper measuring coil (9) and

said lower measuring coil (10) are interconnected such that said first amplitude and said second amplitude mutually compensate one another at least in part.

4. The method according to claim 3, characterized in that an exciting coil (6) is used which coaxially extends around a central axis (8) of said sensor body (2; 3; 4; 5).

5. A thermal working machine for working a workpiece consisting of a ferromagnetic material, comprising a thermal working tool (1) which is movable along a workpiece surface (7) and comprises a torch head (2) which has exchangeably mounted thereon cutting or welding tools (3; 4; 5) extending between said torch head (2) and said workpiece surface (7), and comprising a distance controller for setting a predetermined working distance (A) between said working tool (1) and said workpiece surface (7), said distance controller including an exciting element (6) that is movable with said working tool (1) for producing a magnetic field which is effective in a sensor body with ferromagnetic properties above said workpiece surface (7) and in the area of said workpiece surface (7), a measuring device (9, 10) for sensing said magnetic field or changes thereof, and an evaluating unit (21-27) by means of which measurement signals of said measuring device are evaluated for setting a control variable of said distance controller, characterized in that said torch head (2) and at least one of said cutting or welding tools (3; 4; 5) contain ferromagnetic material and form at least part of said sensor body (2; 3; 4; 5).

6. The working machine according to claim 5, characterized in that said exciting element is designed as an exciting coil (6) through which said sensor body (2; 3; 4;5) extends such that magnetic field lines (13) extend therein above and below a cross-sectional surface which includes the central coil plane (14) of said exciting coil (6), an upper measuring element (9) and a lower measuring element (10) being provided, and said upper measuring element (9) extending in the area above said central coil plane (14), and said lower measuring element (10) in the area below said central coil plane (14).

7. The working machine according to claim 6, characterized in that said measuring elements are designed in the form of an upper measuring coil (9) and a lower measuring coil (10), said upper measuring coil (9), said lower measuring coil (10) and said exciting coil (6) having a joint central axis (8) in which said sensor body (2; 3; 4; 5) extends.

8. The working machine according to claim 7, characterized in that said upper measuring coil (9) and said lower measuring coil (10) are designed such that the voltages produced in said measuring coils (9; 10) compensate one another in the working position of said working tool (1).

9. The working machine according to any one of the preceding claims 5 to 8, characterized in that said torch head (2) and at least one of said cutting or welding tools (3; 4; 5) consist of ferromagnetic material.

10. A cutting or welding tool for use in a working tool for the thermal working machine according to any one of claims 5 to 9, said tool being exchangeably mounted on a torch head (2), characterized in that said cutting or welding tool (3; 4; 5) consists of ferromagnetic material.